7. INSTITUTIONAL CONTROLS AND SITE USE RESTRICTIONS

Institutional controls, as defined by Chapter 173-340-440(1), are measures undertaken to limit or prohibit activities that may interfere with the integrity of a cleanup action, or result in exposure to hazardous substances at the site. Institutional controls are incorporated into the cleanup action proposed for the Park because residual concentrations of hazardous substances in soil and groundwater will remain at the site after cleanup action implementation, as described in Section 11 of this Cleanup Action Plan. The following institutional controls will be incorporated into the proposed cleanup action for the Park:

Physical Measures, Use Restrictions, Maintenance Requirements and Educational Programs

- Maintenance and improvement (as necessary) of existing or revised fencing around the cracking towers ((~~and the northwest area of the Park~~)) until such time as these areas may be developed and either meet clean up levels or install alternative institutional controls, such as a vegetated soil cover consistent with section 4.1.2;

- Inspection and maintenance of the entire soil cover system;((~~and~~))

- Changes in use of park lands or changes to physical barriers or other structures, such as fences or pavement, may be made subject to written authorization by Ecology so long as appropriate cleanup actions occur in accordance with this Cleanup Action Plan or an approved revised Cleanup Action Plan in accordance with Chapter 173-340 WAC; and

- Ecology approval of a soils management plan for future park development or construction projects that disturb the soil cover or provide for development, including open area access, to areas formerly fenced or separated by other physical barriers (e.g., pavement);

- Maintenance and improvement (as necessary) of existing warning signs in place at the Park. These signs warn users not to eat dirt, drink water from Lake Union, wade in Lake Union, or swim in Lake Union. Additional signs may be necessary in areas where changes of use or changes to physical barriers are made. Signs relating to Lake Union will be removed when Ecology determines that they are no longer necessary to protect public Health.

Restrictive Covenant for the Park and Harbor Patrol Properties

- Restriction of activities that could disturb soils or shallow groundwater at the Park;

- Procedures to be followed for Park projects that may disturb soil or groundwater (such as development of contingency plans for characterization and disposal or hazardous substances);

- Prohibition of extraction of shallow groundwater beneath the site for purposes other than remediation; and

- Construction requirements for any deep wells or borings that might penetrate the glacial till layer, to prevent introduction of shallow contamination into deeper groundwater zones.

8. JUSTIFICATION FOR SELECTING LOWER PREFERENCE CLEANUP TECHNOLOGIES

Chapter 173-340-360(4) WAC specifies that cleanup technologies for hazardous substances applied in cleanup actions are to be considered in the following order of decreasing preference:

(1) Reuse or recycling;

(2) Destruction of detoxification;

(3) Separation of volume reduction, followed by reuse, recycling, reduction, or detoxification;

(4) Immobilization;

(5) On-site or off-site disposal at an engineered facility designed to minimize future release of hazardous substances and in accordance with applicable state and federal laws;

(6) Isolation or containment with attendant engineering controls; and

(7) Institutional controls and monitoring.

The components of the proposed cleanup action at the Park that utilize lower preference cleanup technologies are the containment of contaminated soils throughout the Park, and the use of institutional controls and monitoring to address tar-impacted soil and groundwater beneath the western part of the Park and the Harbor Patrol site (sixth and seventh of the seven preferences, respectively). The proposed air sparging and soil vapor extraction components of the proposed cleanup action utilize high-preference technologies (reuse/recycling and destruction/detoxification). The justification for the cleanup technologies applied in the proposed cleanup action is described in Section 14 of the Focused Feasibility (FFS) report.

As discussed in the FFS report, investigations conducted at the Park from the early 1970s to the present indicate that most of the Park was filled with varying thicknesses of materials derived from the former manufactured gas plant operation (including waste debris containing hazardous materials). Most of these soils exceed MTCA Method B soil cleanup levels for the chemicals of concern identified in the FFS report (arsenic and polynuclear aromatic hydrocarbons [PAHs]). The FFS report concluded that cost of removal and off-site disposal of contaminated soils at the Park is substantial and disproportionate to the incremental degree of protection provided by this alternative (per Chapter 173-340-360(5)(vi) WAC), in comparison to the proposed combination containment with a soil cover and by institutional controls.

The FFS report also concluded that tar impacts on soil and shallow groundwater beneath upland areas in the western part of the Park and the adjacent Harbor Patrol property are mitigated by natural attenuation processes and do not result in exceedances of groundwater cleanup action levels at the points where groundwater discharges to Lake Union. The tar-impacted soils above the water table are contained by soil cover or paving. Tar that migrated downward through the shallow groundwater zone has moved along the surface of the low-permeability glacial till to depths below the bottom of Lake Union, such that the tar is isolated from the Lake. The glacial till also prevents

the tar from moving downward into deeper groundwater zones. Application of institutional controls to soil and groundwater in the area of the tar impacts will prevent future activities from causing contact of tar-impacted soil or groundwater with humans or the environment.

9. COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS

This section describes the state and federal laws that were determined by the FFS as applicable to the proposed cleanup action selection at the Park. Chapter 173-340-710 (b)(2) WAC specifies that site cleanup actions shall comply with "applicable state and federal laws". This term is interpreted to include legally applicable requirements and those requirements that are relevant and appropriate. Legally applicable requirements include those cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, contaminant, remedial or cleanup action, location, or other situation at the site. Relevant and appropriate requirements are those promulgated under Federal and State law that are not directly applicable, but still address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

Applicable requirements are determined on a case-by-case basis for each cleanup site. Ecology makes the final interpretation as to whether these requirements are correctly identified and are legally applicable or relevant and appropriate. The applicable state and federal laws described in Table 9-1 were considered in the development of cleanup levels for the Park.

Table 9-1. Summary of state and federal laws potentially applicable to cleanup actions at Gas Works Park.

Statute/Regulation	Requirements	Discussion
City of Seattle Building Code ***Citation*** Section 3.06.040 SMC	Local ordinances implement codes and standards for all construction activities.	Plan review and building permit not required, but planned facilities must meet substantive requirements of applicable codes.
Federal Clean Air Act: New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants, National Ambient Air Quality Standards ***Citation*** 42 USC 7401-7642 40 CFR Subpart 50, 60, 61, 63	Establishes program for source registration and fee payment to restrict emissions, use Best Available Control Technology, and ensure compliance with air quality standards.	Emissions to the atmosphere will comply with substantive requirements of these regulations; however, source registration is not required per MTCA exemption.
Federal Resource Conservation and Recovery Act (RCRA) ***Citation*** 42 USC 6902 et seq	Requires permits for facilities that treat, store, or dispose of hazardous waste.	Hazardous/dangerous waste generated during Park cleanup will be manifested only to permitted disposal facilities.
Federal Safe Drinking Water Act ***Citation*** 42 USC 300f et seq 40 CFR 141,143	Defines Maximum Contaminant Levels:	Neither shallow groundwater zone beneath the Park nor Lake Union are usable for water supply.
Federal Water Pollution Control Act (aka Clean Water Act), National Pollutant Discharge Elimination System (NPDES) ***Citation*** 33 USC Sec. 303, 304 40 CFR Part 122, 125	Establishes State permit program for discharge of pollutants and wastewater to surface waters. Requires all known, available and reasonable methods of treatment (AKART).	No such discharges are planned at the Park.
Federal Water Pollution Control Act (aka Clean Water Act), Surface Water Quality Standards ***Citation*** 33 USC Sec. 303, 304 40 CFR 131. Qlty Criteria for Water (EPA, 1986, rev. 1987)		Same as above.

Table 9-1. Summary of state and federal laws potentially applicable to cleanup actions at Gas Works Park (continued).

Statute/Regulation	Requirements	Discussion
State Water Pollution Control Act, NPDES Regulations ***Citation*** RCW 90.48 WAC 1773-220		Same as above.
State Water Pollution Control Act, Water Quality Standards for Surface Water ***Citation*** RCW 90.48 WAC 173-201		Same as above.
Federal Water Pollution Control Act (aka Clean Water Act) ***Citation*** 33 USC 1251-1387 33 CFR 320-330 40 CFR 230	Add	Add
State Shoreline Management Act (1971) ***Citation*** RCW 90.58 WAC 173-27	Establishes permit program for activities performed within 200 ft of shoreline (including wetlands).	Construction activities will comply with substantive requirements of these regulations; however, permit not required per MTCA exemption.
Puget Sound Air Pollution Control Agency (PSAPCA) ***Citation*** Regulation III		See Federal Clean Air Act.
State Clean Air Laws: Controls for Air Toxics (Air Quality Standards) ***Citation*** RCW 70.94 WAC 173-460	Air quality standards for toxics:	See Federal Clean Air Act.
State Environmental Policy Act (SEPA) ***Citation*** RCW 43.21C WAC 197-11	Requires submittal of checklist describing environmental impacts of proposed projects, public notice, and possibly additional project analyses and public involvement.	SEPA checklist is submitted with CAP.

Table 9-1. Summary of state and federal laws potentially applicable to cleanup actions at Gas Works Park (continued).

Statute/Regulation	Requirements	Discussion
State Hazardous Waste Management Act ***Citation*** RCW 70.105		
Definition/generation of hazardous/dangerous waste ***Citation*** 40 CFR 261, 262, 264 WAC 173-303-070 through 110	Defines threshold levels and criteria to determine whether materials are hazardous/dangerous wastes.	Dangerous/hazardous waste generated during Park cleanup will comply with these regulations.
Transportation of hazardous/dangerous waste ***Citation*** 40 CFR 263 29 CFR WAC 446-50	Defines requirements for off-site transportation of waste.	Proper transportation of waste off-site will be conducted.
Disposal Requirements and Land Disposal Restrictions **Solid Waste Disposal Facilities** ***Citation*** 40 CFR 268 WAC 173-303-140	Defines pre-treatment and land disposal restrictions for certain wastes	Proper disposal of hazardous/dangerous wastes off-site will occur. Wastes probably will not require additional treatment.
State Hydraulics Act ***Citation*** RCW 75.20 WAC 220-110	Establishes permit program under Dept. of Wildlife/Fisheries for projects that may change natural flow of "waters of the state."	Construction activities will comply with substantive requirements of these regulations; however, permit not required per MTCA exemption.
State Model Toxics Control Act ***Citation*** RCW 70.105D.090	Defines hazardous waste cleanup policies. Actions conducted under consent decree are exempt from the procedural requirements or RCW 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 and the procedural requirements of any laws requiring or authorizing government permits or approvals for remedial actions. Action shall comply with substantive requirements adopted pursuant to such laws and shall consult with government agencies charged with implementing such laws.	FFS and CAP for the park were performed under Agreed Order. Cleanup activities will comply with substantive requirements.

Table 9-1. Summary of state and federal laws potentially applicable to cleanup actions at Gas Works Park (continued).

Statute/Regulation	Requirements	Discussion
State Model Toxics Control Act ***Citation*** RCW 70.105D WAC 173-340-720	Soil and groundwater cleanup levels	Method B cleanup levels applied to the Park
State Water Quality Standards for Groundwaters ***Citation*** WAC 173-200	Groundwater Quality Standards	Shallow groundwater at the Park is not a current or future source of drinking water.

10. COMPLIANCE WITH MTCA REQUIREMENTS

The cleanup levels will be met at the specified points of compliance by the proposed cleanup actions to be implemented at Gas Works Park, and human health and the environment will be protected. The following discussion relates the analysis and evaluations presented in this Cleanup Action Plan to the requirements for selection of cleanup actions contained in WAC 173-340-360. This discussion is presented in order to show that the minimum requirements of MTCA will be met by the proposed cleanup actions.

10.1 THRESHOLD REQUIREMENTS

The proposed cleanup action must comply with the MTCA threshold requirements (WAC 173-340-360(2)). The four threshold requirements are listed and addressed below:

10.1.1 Protect Human Health and the Environment

Each action proposed for Gas Works Park environmental cleanup has been evaluated for protection of human health and the environment. Ecology has determined that the proposed cleanup actions meet this first threshold requirement.

10.1.2 Comply with Cleanup Standards

The proposed actions comply with the cleanup standards summarized in Section 3 of this CAP.

10.1.3 Comply with State and Federal Laws

Compliance with applicable state and federal laws has been determined for the proposed cleanup actions through the detailed analysis presented in Section 9 of the FFS report and Sections 8 and 9 of this CAP.

10.1.4 Provide Compliance Monitoring

The compliance monitoring program is described in Section 4.2 of this CAP.

10.2 OTHER REQUIREMENTS

The proposed cleanup action must also comply with other requirements listed in WAC 173-340-360(3). The three other requirements are listed and addressed in the following sections.

10.2.1 Use Permanent Solutions

WAC 173-340-360(5)(d) states that "Ecology recognizes that permanent solutions may not practicable for all sites," and proceeds to list seven criteria that should be used to determine whether a cleanup action is "permanent to the maximum extent practicable." The seven criteria are listed and addressed below for the proposed cleanup actions:

1. **Overall protectiveness of human health and the environment.** The proposed cleanup actions will meet the cleanup standards for soils and groundwater over time within a reasonable restoration time-frame.

2. **Long-term effectiveness.** The actions provide a highly effective long-term solution for impacted soil using well-established means of containment. The air sparging/soil vapor extraction system provides an effective long-term solution by reducing benzene levels in groundwater over the operating life of the system.

3. **Short-term effectiveness.** Once installed, the actions provide a highly effective short-term solution for soil using well-established means of containment. During construction, effective controls will be in place to reduce potential for migration of contaminants from the site to air or surface water. The air sparging/soil vapor extraction system will gradually increase the net removal of contaminants and reduce benzene levels over the operating life of the system.

4. **Permanent reduction of toxicity, mobility, and volume of the hazardous substance.** The cleanup actions, especially air sparging and soil vapor extraction, actively remove contamination from the groundwater and soil and prevent or minimize present and future releases of the contaminants.

5. **Ability to be implemented.** All of the technologies used in the proposed cleanup actions are proven and effective means of removal or containment. Offsite treatment and disposal facilities are well established in the northwest for any contaminated materials that need to be removed offsite. The services and materials are readily available in the Seattle area, and the size and complexity of the project are well within the means of area contractors. Construction will cause short-term disruptions to current park activities, but the long-term operation and maintenance of the cleanup activities will be fully compatible with continued park use.

6. **Cleanup costs.** Cleanup costs for the proposed cleanup actions are not substantially greater than costs for the lower-preference cleanup action alternative 2 (soil cover only), are less than costs for alternative 4 (downgradient cut-off wall), and are much less than the costs for contaminant source excavation and off-site disposal.

7. **The degree to which community concerns are addressed.** The cleanup actions address community concerns, especially with regards to prevention of public contact with soil and groundwater contamination, and restoration of the Park for public use after construction of the cleanup action.

Based upon these evaluations and the supporting analysis contained in the FFS, the proposed cleanup actions will meet the requirements of WAC 173-340-360(5)

WAC 173-340-360(5)(e) lists requirements intended to ensure a bias toward permanent solutions. The five requirements are listed and addressed below:

1. **The cleanup action shall prevent or minimize present and future releases and migration of hazardous substances in the environment.** The cleanup actions, especially air sparging and soil vapor extraction, actively remove contamination from the groundwater and soil and prevent or minimize present and future releases of the contaminants. The soil cover greatly minimizes potential exposure of the public to soil and groundwater contaminants.

2. **The cleanup action shall provide for a net reduction in the amount of a hazardous substance being released from the source area**. The cleanup action of air sparging and soil vapor extraction reduces the amount of hazardous substances available for release, and the geomembrane cap over the air sparging system further reduces surface water infiltration and thus groundwater flux from the contaminant source area.

3. **The cleanup action shall not rely primarily on dilution and dispersion of the hazardous substance if active remedial measures are technically possible.** Active remedial measures are being taken to reduce the amount of hazardous substances in the source area and surrounding soils. Thus the cleanup action does not rely on dilution and dispersion.

4. **A cleanup action relying primarily on institutional controls and monitoring shall not be used where it is technically possible to implement a cleanup action alternative that utilizes a higher preference cleanup technology for all or a portion of the site.** The cleanup action does not rely primarily on institutional controls and monitoring.

5. **A cleanup action involving off-site transport and disposal of hazardous substances without treatment shall not be used if a treatment technology or method exists which will attain cleanup standards and is practicable.** Off-site transport and disposal of hazardous substances is minimized. The air sparging and soil vapor extraction system will treat on-site contaminated materials to cleanup standards. Materials that are transported off-site will be treated as appropriate before land disposal at an appropriate landfill (soils) or recycled as supplementary fuel (benzene, etc.).

10.2.2 Provide Reasonable Restoration Time Frame

Factors considered when establishing a reasonable restoration time frame include potential risks posed by the site to human health and the environment; the practicability of achieving a shorter restoration time; current and future use of the site, surrounding areas, and associated resources; availability of alternative water supplies; likely effectiveness and reliability of institutional controls; ability to control and monitor migration of hazardous substances from the site; toxicity of the hazardous substances at the site; and natural processes which reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions. Additionally, a longer period of time may be used for the restoration time frame for a site to achieve cleanup levels at the point of compliance if higher preference cleanup

technologies are used. The permanent destruction of contaminants by the air sparging/SVE remedial action is such a higher preference technology.

Modeling shows that, following treatment by air sparging/SVE, surface water criteria will be met within 2 to 27 years. The variation of restoration time frames depends primarily of the oxygen content of the aquifer. This cannot be accurately predicted before implementation of the air sparging/SVE remedial action and must be measured afterwards.

10.2.3 Consider Public Concerns

Concerns expressed by the public to date (preventing contact of soil and groundwater contamination with Park users; restoring the Park to a usable condition after construction of the cleanup action) are addressed by the proposed cleanup action. Additional public concerns presented during the public comment period will be addressed by a responsiveness summary and submitted with the final Park environmental cleanup documents.

11. MANAGEMENT OF HAZARDOUS SUBSTANCES REMAINING ON THE SITE

As described in previous sections of this Cleanup Action Plan, the proposed cleanup action for the Park utilizes containment of contaminated soils that are accessible with a vegetated soil cover (described in Section 4.1.2) and development of institutional controls to protect human health and the environment from hazardous substances that will remain at the site. The hazardous substances in soil and groundwater are summarized in Tables 3-1 and 3-2, which include chemical names, maximum detected concentrations, and applicable cleanup levels. The hazardous substances remaining in place at the Park will be managed by means of the compliance monitoring described in Section 4.2 , containment measures, and institutional controls described in Section 7 of this Cleanup Action Plan, such that migration and contact with these substances will be prevented. As described in Section 7, one type of containment measure may be substituted with another type with the written permission of Ecology.

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